Overview

The HP StorageWorks 2000fc Modular Smart Array (MSA2000fc) represents the fibre channel model of the MSA2000 family (which includes the MSA2000i iSCSI model and future SAS-connect versions), a new generation of HP storage arrays specifically designed for entry-level customers and features the very latest in functionality and technology at highly affordable price points.

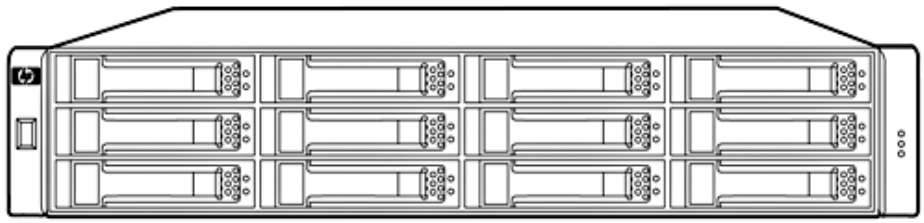
The MSA2000fc is a 4Gb Fibre Channel connected 2U storage area network (SAN) or direct connect solution designed for small to medium size deployments or remote locations. It comes in three models - a basic single controller model for low initial cost with the ability to upgrade later; a model with dual controllers standard; and a high performance model with dual enhanced controllers for the most demanding entry-level situations. Each model comes standard with twelve drive bays able to simultaneously accommodate 3.5-inch enterprise-class SAS drives and archival-class SATA drives. Additional capacity can easily be added when needed by attaching up to three MSA2000 12 bay drive enclosures. Maximum raw capacity ranges from 5.4TB SAS or 12TB SATA in the base cabinet, to over 21.6TB SAS or 48TB SATA with the addition of the maximum number of drive enclosures. Larger capacity drives are continually in qualification, providing for even greater capacity. It has been fully tested up to 64 hosts. NOTE: There are no additional hidden charges, licenses or fees as you add enclosures or hosts and users.

The MSA2000 offers many distinct features such as the ability to mix SAS and SATA RAID sets (VDisk) within the same enclosure greatly increases the flexibility and economy of assigning mission-critical data and archival data to the proper drive type. The wide variety of RAID levels supported assures the user of just the right level of performance and protection demanded by their application. The capability of implementing controller-based snapshots and clones affordably brings enterprise-class functionality into smaller departments, remote locations, and small but growing companies.

The MSA2000fc is a member of HP StorageWorks Modular Smart Array offerings, delivering simple and affordable storage technology to meet today's demanding and growing IT needs. These storage solutions offer excellent price/performance and availability features for direct attach environments, small clusters, workgroups and entry-level SAN environments. Each solution is designed to be easy to deploy, secure, with low management costs, while driving rapid return on investment.

What's New

- HP MSA2 450GB 3G 15K 3.5 inch SAS HDD



MSA2000fc

Overview

Models

HP StorageWorks MSA2000fc Modular Smart Array	HP StorageWorks 2012fc Single Controller Modular Smart Array	AJ742A
	HP StorageWorks 2012fc Dual Controller Modular Smart Array	AJ743A
	HP StorageWorks 2212fc Dual Enhanced Controller Modular Smart Array	AJ745A
	HP StorageWorks 2000fc Modular Smart Array Controller (for the 2012fc)	AJ744A
	HP StorageWorks MSA2000 Single I/O 3.5 in 12 Drive Enclosure (w/ two .6m SAS cables)	AJ749A
	HP StorageWorks MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure (w/ two .6m SAS cables)	AJ750A
	HP StorageWorks MSA2000 Drive Enclosure I/O Module	AJ751A

Features and Benefits

Key Features

- Highly efficient consolidation and sharing of storage geared to departmental and small to medium business requirements
- Flexibility in drives (MSA2000 family-specific) Cost efficient plus high-availability choices
- Enterprise-class SAS or archival-class SATA drives as the need and budget dictate
- Dual-ported SAS drives for enterprise needs
- Large capacity SATA drives for inexpensive archival storage
- Able to mix SAS and SATA drives within the same drive enclosure
- Choose either single or dual controller array models
- Choice of low cost single I/O or high-availability dual I/O drive enclosure models

Customer Benefits

- The HP StorageWorks 2000 Modular Smart Array family manages growing storage requirements across multiple HP ProLiant servers for customers who need a centralized dedicated storage solution for applications. SANs allow for controlled, cost-effective growth and increased protection of data.
- Its ease of management allows a department or small company to effectively handle growing storage requirements with a minimum of complexity.
- The MSA2000fc extends the benefits of shared storage resources (e.g. SAN) to first time implementers on a limited budget
- The modular design allows the user to start relatively small but supports future growth to hundreds of users and up to 21.6TB of SAS or 48TB of SATA storage
- The optional controller-based snapshot and clone capability of the MSA2000 family allows the smaller departmental user or company to implement functionality once only available to much larger firms with expensive arrays.

HP MSA2000fc Models At a Glance:

- High performance Modular Smart Array controller(s), each with two 4Gb Fibre Channel ports
- Single and dual controller models
- Dual Enhanced Controller model with more powerful processor (700MHz Pentium II vs. Celeron 566 MHz), ideal for video streaming and large file writes, especially true for small block sizes
- Standard model performance is measured at greater than 90K IOPs from cache and 865MB/s sustained throughput from disk. The Dual Enhanced controller model measures at greater than 120,000 IOPs from cache and 1,150 MB/s throughput from disk.
- 1 GB transportable cache per controller - battery-free cache backup with super capacitors and compact flash
- 256 LUNs with 16TB LUNs supported
- 2U rack mount chassis combining both the controller and disk shelf
- Twelve 3.5 inch dual-ported SAS or SATA drive bays (supports mixing of drive types in a single shelf)
- Supports expansion to 3 additional enclosures for a total of 48 disks
- Redundant power supplies and fans are standard
- RAID levels 0, 1, 3, 5, 6, 10, 50
- Non-disruptive on-line controller code upgrade (requires dual controllers w/ multi-pathing software)
- Heterogeneous support for 32-bit and 64-bit Windows, Red Hat and SuSE
- Qualified and certified for Windows and Linux clustering
- Optional controller-based snapshot and clone functionality

Family Information

	MSA2000fc	MSA2000i	MSA2000sa	EVA4400
Capacity (raw) Minimum / with maximum additional drive enclosures	5.4TB SAS or 12TB SATA w/ 3 drive enclosures: 21.6TB SAS or 48TB SATA	5.4TB SAS or 12TB SATA w/ 3 drive enclosures: 21.6TB SAS or 48TB SATA	5.4TB SAS or 12TB SATA w/ 3 drive enclosures 21.6TB SAS or 48 TB SATA	5.4TB FC or 12TB FATA w/ 8 drive enclosures 43TB FC or 96 TB FATA
Controller Cache	1 GB per controller	1 GB per controller	1 GB per controller	2 GB per controller
Host connect MSA2000 has 1 or 2 controllers, EVA has 2 controllers standard	Two 4Gb Fibre Channel ports per controller	Two 1GbE iSCSI ports per controller	Two 3Gb SAS ports per controller	Two 4Gb Fibre Channel ports per controller
Maximum Drives	48	48	48	96
Maximum host supported	64	16	4	512
Snapshot, remote replication	Snapshot, clone	Snapshot, clone	Snapshot, clone	Snapshot, clone, remote data replication
Use for Storage	Primary Storage with SAS Secondary with SATA	Primary Storage with SAS Secondary with SATA	Primary Storage with SAS Secondary with SATA	Primary Storage with FC Secondary with FATA

NOTE: maximum available storage capacity depends on the RAID level being implemented, and is based on maximum number of LUNs and LUN size.

Product Technology	**4Gb Fibre Channel technology**	Two host ports per controller, shipped with SFPs. the MSA2000 controller can run in either point-to-point or FCAL (loop). The default is FCAL which is used in Direct Connect, particularly with two controllers. The PtP (fabric) mode is used with almost all switches.
	Modular Chassis	2U, 12 Large Form Factor drive bays, accommodating SAS and SATA. Comes standard with one or two controllers.
	Drives available	Serial Attached SCSI (SAS) enterprise-class drives designed for high volume, 24x7 usage. Serial-ATA (SATA) are usually reserved for archival of data as they are both relatively inexpensive and are available in very large capacities. The MSA2000 family of arrays can accommodate both SAS and SATA drives within the same enclosure making it ideal to have both business-critical, high activity files on SAS drives while using snapshot or clone capability to keep back-up data on the less expensive drives. SAS drive performance can be approximately 30%greater than SATA performance on sequential host IO. SAS performance excels in sequential lower latency response time and random IO per second transaction performance due to higher rpm disk speeds yielding lower seek times. SAS random performance is greater than 2x SATA. NOTE: MSA2 3.5" Large Form Factor (LFF) drives are for use only in the MSA2000 family.
	Scalability	Up to 5.4TB SAS or 12TB SATA, expandable to 21.6TB SAS or 48TB SATA with the addition of a maximum of three MSA2000 3.5 inch Drive Enclosures.
	LUNs	The MSA2000 family of arrays supports 256 LUNs and LUN sizes up to 16TB. The arrays support LUN expansion and deletion of any LUN.
	RAID 0, 1, 3, 5, 6, 10, 50.	In addition to the usual RAID levels, the MSA2000 family features several important additional levels. RAID 6 is the highest level of RAID protection. It allocates two sets of parity data across drives and allows simultaneous write

operations. It can withstand two simultaneous drive failures without downtime or data loss. RAID 10 is mirroring and striping without parity. It is the most popular of the multiple RAID levels, allowing large arrays with high performance in most cases and superior fault tolerance. RAID 50 combines the block striping and parity of RAID 5 with the straight block striping of RAID 0, yielding higher performance than RAID 5 through the addition of RAID 0, particularly during writes.

Performance

Performance numbers are a guideline as established by tests in a lab environment. Forty-eight 300GB 15K SAS drives were used in dual controller configurations of four vDisks with 12 physical drives per vDisk. Each vDisk presented a single volume of maximum capacity according to RAID level. Number and type of applications, number of hosts will affect overall performance.

Workload	MSA2012fc	MSA2212fc
MSA2000 RAID 10 Performance Results (rounded)		
Random Reads IOPs	10,600	11,200
Random Writes IOPs	5,000	7,800
Random Mix IOPs 60/40 read/write	6,700	8,900
Sequential Reads MB	650	1,000
Sequential Writes MBs	330	470
MSA2000 RAID 5 Performance Results (rounded)		
Random Reads IOPs	10,200	10,700
Random Writes IOPs	1,700	2,400
Sequential Reads MBs	670	1,000
Sequential Writes MBs	380	580
Random Mix IOPs 60/40 read/write	3,500	5,700

Configuration and Management Tools

HP StorageWorks MSA Storage Management Utility (SMU). Management access, out-of-band: WEB GUI, CLI. Interface Types: Mini DB9 RS232, 10/100 Ethernet Protocols Supported SNMP, SSL, SSH, SMTP, HTTP, Telnet

Hot Plug Expansion and Replacement Support

The MSA2000fc supports hot plug expansion and replacement of redundant controllers, enclosures, fans, power supplies, and I/O modules for simple, fast installation and maintenance.

Snapshot and Clone

Optional controller based functionality. Offers higher levels of data protection, enabling an almost instant recovery from data failure or corruption. Offers alternative development testing of 'offline' production data and the ability to backup snapped/cloned data.

Family Information

Overview	The MSA2000fc comes integrated with web browser based software for storage and RAID management, setup, configuration and troubleshooting. This reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP storage solution.
Server Compatibility	Supports most HP ProLiant servers including • HP ProLiant DL, ML • HP ProLiant c-Class Blade Servers
Industry Standard X86 servers support	• Supports most multi-vendor industry standard 32-bit Intel and AMD based (x86) servers. HP requires the Third-Party Server to be logo'd and listed on the Microsoft Windows Server Catalog. • Refer to the Microsoft website: http://www.microsoft.com/windows/catalog/server/ • HP StorageWorks Division recommends that the Third-Party Server Vendor is an active member of TSANet. Refer to the TSANet website for details: www.tsanet.com
OS Support	• Microsoft Windows Server 2008 IA32 (Standard, Enterprise, Datacenter) • Microsoft Windows Server 2008 x64 (Standard, Enterprise, Datacenter) • Microsoft Windows 2003 and 2003 R2 • Microsoft Windows 2003 X64 • Red Hat Linux 4 & 5 (32/64) • SuSE SLES 9 & 10 (32/64) • VMware ESX 3.0.1, 3.0.2, 3.5 • Integrated Citrix XenServer HP Enterprise. Citrix Xen Enterprise 4.1.0-7846 (AMD64, EMT64)
Oracle	• Supported with Oracle single instance and cluster configurations for Oracle 9i, 10g, and 11g • Windows 2008 is supported with Single Instance but not RAC. This functionality is not yet supported by Oracle. • RHEL5 Kernel Versions Including Oracle Enterprise Linux, OEL • NOTE: snapshot functionality is not supported with ASM.
Web Browser support	• MSA2000fc supports target based management, and includes a Web interface and a telnet interface, and requires a web browser for management. Only Microsoft Internet Explorer V6.X and above, and Mozilla Firefox 1.0.7 or later are supported

MSA2000 Snapshot and Volume Copy Software

Product Features

Data Protection

- Snapshots create up to 64 point-in-time pictures of data
- Volume Copies create up to 128 point-in-time copies of data
- Recovery is instant - revert data from any previous Snapshot or Volume Copy
- Backup 'snapped' data to disk, virtual tape, or physical tape without a backup window

Data Testing

- Snap or clone data to test the performance of a software application on 'offline' production data
- Snap or clone data to test how a software patch or enhancement will function on 'offline; production data

HP StorageWorks 2000 Modular Smart Array Snapshot 64 Software LTU	T5512A
HP StorageWorks 2000 Modular Smart Array Snapshot 8 Software LTU	T5513A
HP StorageWorks 2000 Modular Smart Array Snapshot 8 to 64 Upgrade Software LTU	T5515A
HP StorageWorks 2000 Modular Smart Array Volume Copy Software LTU	T5514A

Path failover (MPIO)

MPIO Basic Failover for Windows provides a single multi-path solution for HP StorageWorks MSA2000fc Modular Smart Array on HP ProLiant servers by providing basic path failover. Supports Windows 2003, Windows 2003 R2, and Windows 2003 X64 operating systems.

- HP MPIO Full Featured DSM for MSA2000fc v2.2.0.22
- Microsoft Windows 2008: Microsoft MPIO is bundled with Windows Server 2008 and must be installed as an operating system feature.
- Failover support for Linux is with Device Mapper 4.0.
- Xen: Inbox Device Mapper

HP StorageWorks Storage Mirroring

HP StorageWorks Storage Mirroring Software provides host-based, continuous replication for customers seeking a low-cost alternative to fabric or array-based replication. Patented replication and failover technology continuously captures byte-level data changes as they happen and replicates those changes to one or more target servers at any location without geographic limitations. By replicating only the bytes that change, Storage Mirroring Software uses the absolute minimum bandwidth on your existing LAN or WAN to replicate your data. Storage Mirroring also provides server failover where a production server can automatically be 'replaced' by the storage mirroring server in the event of failure. Couple Storage Mirroring with MSA2000 Snapshots and/or Volume Copy to achieve an Enterprise class data protection strategy creating different data recovery points using continuous data protection with Storage Mirroring and point-in-time data protection with Snapshots and/or Volume Copy.
Storage Mirroring Software supports:

- Any DAS, NAS, and SAN storage device.
- Any Windows ProLiant server including all ML, DL, and BL platforms
- Many Windows platforms including Windows Server 2000, Windows Server 2003, Windows Server 2003 R2, Windows Storage Server 2003, Windows Storage Server 2003 R2, 64bit Windows, and Windows on Itanium

For more information visit http://h18006.www1.hp.com/products/storage/software/sm/index.html

HP StorageWorks Storage Mirroring Software Windows Server Edition 1 LTU	T4441A

Optional Software

HP StorageWorks Storage Mirroring Software Windows Enterprise Server Edition 1 LTU	T4443A
HP StorageWorks Storage Mirroring Software Windows NAS Edition 1 LTU	T4445A
HP StorageWorks Storage Mirroring Software for AiO Edition 1 LTU	T5321A
HP StorageWorks Storage Mirroring Software for 5 Virtual Machines 1 LTU	T4447A

NOTE: For more information visit http://h18006.www1.hp.com/products/storage/software/sm/index.html

HP ProLiant Storage Server gateways: Add more value to your MSA array

Stretch your MSA2000 array investment by adding file & print services, iSCSI connectivity, and management hosting with a ProLiant Storage Server gateway platform. HP ProLiant Storage Servers are optimized file and print server solutions that are built on industry-standard HP ProLiant servers and come with either Microsoft Windows Storage Server 2003 R2 or Windows Unified Data Storage Server 2003 operating system pre-installed. Since they're Windows-based, network integration is easy, your tools and data protection applications run right on the box, and management has a familiar look and feel. Like many Network Attached Storage (NAS) devices, they support heterogeneous file serving environments and are pre-configured to install in minutes.
A DL380 G5 x64 SAN Storage Server is a file/iSCSI gateway that adds IP-based services to your Fibre Channel array or SAN. So it not only enhances your MSA investment with file and print services, but it helps you save even more by enabling tiered (Fibre Channel and iSCSI) block access for application servers. All of your important client and server data can be managed, scaled, and protected on a single MSA2000 array.

NOTE: For more information visit: http://www.hp.com/go/storageservers

HP ProLiant DL380 G5 x64 SAN Storage Server NOTE: Microsoft Windows Unified Data Storage Server 2003 Enterprise x64 Edition O/S; Includes Microsoft iSCSI Software Target and a cluster license	AG771A
HP ProLiant DL380 G5 Base Storage Server NOTE: Microsoft Windows Storage Server 2003 R2 Standard x64 Edition O/S; Microsoft iSCSI Software Target is optional and clustering is not supported.	AG815A
HP StorageWorks FC2142SR 4Gb PCIe HBA	A8002A
HP StorageWorks FC2242SR Dual Channel 4 Gb PCIe HBA	A8003A
HP StorageWorks FC1142SR 4Gb PCIe HBA	AE311A
HP StorageWorks FC1242SR Dual Channel 4 Gb PCIe HBA	AE312A

Warranty

- Three-year limited warranty
- Three years parts exchange
- Next Business day delivery

Enclosures, Hard drives, and Options for the MSA2000fc carry their own warranty. Refer to HP's Limited Warranty Statement for more information.

The MSA2000fc has been designed with customer self repairable parts to minimize repair time and provide greater flexibility in performing defective parts replacement. Please refer to HP's limited warranty Statement and parts replacement instructions for further details.

http://h18006.www1.hp.com/products/storageworks/warranty.html

Products included in various Kits carry their own individual warranties.

NOTE: The warranty of the hard drive options purchased with the MSA2000fc product is different for SAS hard drives versus SATA hard drives. SAS hard drive options have a three year warranty and SATA hard drives options have a one year warranty.

Warranty Upgrade Options

- Response - Upgrade on-site response from next business day to same day 4-hour response or 6 Hour Call To Repair
- Coverage - Extend hours of coverage from next business day to 9 hours x 5 days to 24 hours x 7 days
- Duration Select duration of coverage for a period of 1, 3, 4 or 5 years

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HP Care Pack Information

- HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.
- HP Care Pack is not available for less than the product's warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.

For additional information on Product Services and HP Care Pack, as well as orderable part numbers, please refer to the URL: http://www.hp.com/hps/carepack/.
If you have specific questions about availability or how to obtain services contact your local HP representative. Contact information for your local area can be found at:
http://welcome.hp.com/country/us/en/contact_us.html

Software Product Services

Product support provides the customer access to HP's experienced technical support resources, as well as access to HP's Information Services database for support on a variety of multi-vendor/multiplatform software products. Product support includes escalation and problem coordination with the appropriate engineering group. HP Services offer a variety of options to allow you to tailor your product service to meet the needs of your organization. Basic warranty on products can be uplifted from day one to ensure you receive the service you need when you need it.

Service and Support, HP Care Pack, and Warranty Information

Warranty and Support

HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.
The following services are offered as HP Care Pack Services at the time of software product order:

- Software Technical Support 24 x 7 (1, 3, 4, and 5 years) is available 24 hours per day, Monday through Sunday, including holidays (includes phone-in software technical support 24 x 7 and software product and documentation updates).
- HP Care Pack services must be ordered with the product and are prepaid.
- For tailored support contracts based on personalized statement of work contact your local support center via: http://www.hp.com/support.

For additional software product services information for HP Care Pack services, as well as orderable part numbers, please refer to the URLs listed below:
All storage services: http://www.hp.com/hps/storage/.
All HP Care Pack Services: http://www.hp.com/hps/carepack/storage/cp_networked.html.
Software Support HP Care Pack Services: http://www.hp.com/hps/carepack/software/cp_storage.html.
Installation and Startup Services: http://www.hp.com/hps/storage/ns_implementation.html.
If you have specific service questions contact your local HP representative. Contact information for your local area can be found at: http://welcome.hp.com/country/us/en/contact_us.html
Maintenance releases, bug fixes and software patches are available at:
http://welcome.hp.com/country/us/en/support.html.

Hardware Product Services

- Installation services that include basic installation and Array Installation and Startup
- On-site maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage or warranty extension
- RAID setup and performance consulting via statement of work
- Migration service consulting via statement of work
- Environmental, Mission Critical Services

For product services information for HP Care Pack services, as well as orderable part numbers, please refer to the URLs listed below:
All storage services: http://www.hp.com/hps/storage/.
All HP Care Pack Services: http://www.hp.com/hps/carepack/storage/cp_networked.html.
Installation and Startup Services: http://www.hp.com/hps/storage/ns_implementation.html.
If you have specific service questions contact your local HP representative. Contact information for your local area can be found at: http://welcome.hp.com/country/us/en/contact_us.html

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Array Installation and Startup Services

The HP installation and startup for HP StorageWorks MSA Disk Arrays service package provides installation and configuration of HP StorageWorks MSA Disk Array products. Service highlights include:

- Service planning
- Installation and Startup provides installation and configuration of the MSA2000fc. This includes:
  - Service planning
  - Service deployment
  - Installation Verification Testing (IVT) required for this service
  - Customer orientation session
- Please contact your local HP sales organization for further details
- Installation & Startup Care Packs: Flex - HA114A1 #5J0; Fixed: UA868E

Support Services via HP Authorized Commercial Resellers - Flex Care Packs	Array SKUs: AJ742A, AJ743A, AJ745A	
Support Description	Care Pack	Support Band
Support - 1 Yr Next Day Hardware	HA101A1	9CJ
Support - 3 Yr Next Day Hardware	HA101A3	9CJ
Support - 4 Yr Next Day Hardware	HA101A4	9CJ
Support - 5 Yr, Next Day Hardware	HA101A5	9CJ
Support - 1 Yr 4 hr 13x5 Hardware	HA103A1	9CJ
Support - 3 Yr, 4 hr 13x5 Hardware	HA103A3	9CJ
Support - 4 Yr, 4 hr 13x5 Hardware	HA103A4	9CJ
Support - 5 Yr, 4 hr 13x5 Hardware	HA103A5	9CJ
Support - 1 Yr, 4 hr 24x7 Hardware	HA104A1	9CJ
Support - 3 Yr, 4 hr 24x7 Hardware	HA104A3	9CJ
Support - 4 Yr, 4 hr 24x7 Hardware	HA104A4	9CJ
Support - 5 Yr, 4 hr 24x7 Hardware	HA104A5	9CJ
Support - 1 Yr, 6 hr, CTR	HA105A1	9CJ
Support - 3 Yr, 6 hr, CTR	HA105A3	9CJ
Support - 4 Yr, 6 hr, CTR	HA105A4	9CJ
Support - 5 Yr, 6 hr, CTR	HA105A5	9CJ
Support - 1 Yr, Support Plus	HA109A1	9CJ
Support - 3 Yr, Support Plus	HA109A3	9CJ
Support - 4 Yr, Support Plus	HA109A4	9CJ
Support - 5 Yr Support Plus	HA109A5	9CJ
Support - 1 Yr, Support Plus 24	HA110A1	9CJ
Support - 3 Yr, Support Plus 24	HA110A3	9CJ
Support - 4 Yr, Support Plus 24	HA110A4	9CJ
Support - 5 Yr, Support Plus 24	HA110A5	9CJ
Support - 1 Yr, Proactive 24 Service	HA111A1	9CJ
Support - 3 Yr, Proactive 24 Service	HA111A3	9CJ
Support - 4 Yr, Proactive 24 Service	HA111A4	9CJ
Support - 5 Yr, Proactive 24 Service	HA111A5	9CJ
Support - 1 Yr, Critical Service	HA112A1	9CJ
Support - 3 Yr, Critical Service	HA112A3	9CJ
Support - 4 Yr, Critical Service	HA112A4	9CJ
Support - 5 Yr, Critical Service	HA112A5	9CJ

Support Services via HP Authorized Commercial Resellers - Flex Care Packs	Drive Enclosure SKUs: AJ749A, AJ750A	
Support Description	Care Pack	Support Band
Support - 1 Yr Next Day Hardware	HA101A1	9CL
Support - 3 Yr Next Day Hardware	HA101A3	9CL
Support - 4 Yr Next Day Hardware	HA101A4	9CL
Support - 5 Yr, Next Day Hardware	HA101A5	9CL
Support - 1 Yr 4 hr 13x5 Hardware	HA103A1	9CL
Support - 3 Yr, 4 hr 13x5 Hardware	HA103A3	9CL
Support - 4 Yr, 4 hr 13x5 Hardware	HA103A4	9CL
Support - 5 Yr, 4 hr 13x5 Hardware	HA103A5	9CL
Support - 1 Yr, 4 hr 24x7 Hardware	HA104A1	9CL
Support - 3 Yr, 4 hr 24x7 Hardware	HA104A3	9CL
Support - 4 Yr, 4 hr 24x7 Hardware	HA104A4	9CL
Support - 5 Yr, 4 hr 24x7 Hardware	HA104A5	9CL
Support - 1 Yr, 6 hr, CTR	HA105A1	9CL
Support - 3 Yr, 6 hr, CTR	HA105A3	9CL
Support - 4 Yr, 6 hr, CTR	HA105A4	9CL
Support - 5 Yr, 6 hr, CTR	HA105A5	9CL
Support - 1 Yr, Support Plus	HA109A1	9CL
Support - 3 Yr, Support Plus	HA109A3	9CL
Support - 4 Yr, Support Plus	HA109A4	9CL
Support - 5 Yr Support Plus	HA109A5	9CL
Support - 1 Yr, Support Plus 24	HA110A1	9CL
Support - 3 Yr, Support Plus 24	HA110A3	9CL
Support - 4 Yr, Support Plus 24	HA110A4	9CL
Support - 5 Yr, Support Plus 24	HA110A5	9CL
Support - 1 Yr, Proactive 24 Service	HA111A1	9CL
Support - 3 Yr, Proactive 24 Service	HA111A3	9CL
Support - 4 Yr, Proactive 24 Service	HA111A4	9CL
Support - 5 Yr, Proactive 24 Service	HA111A5	9CL
Support - 1 Yr, Critical Service	HA112A1	9CL
Support - 3 Yr, Critical Service	HA112A3	9CL
Support - 4 Yr, Critical Service	HA112A4	9CL
Support - 5 Yr, Critical Service	HA112A5	9CL

Support Services via HP Authorized Commercial Resellers - Flex Care Packs

Software SKUs: T5512A, T5513A, T5514A, T5515A

Support Description	Care Pack	Support Band
Support - 1 Yr, 9X5, Software Technical Support	HA106A1	9Cx
Support - 3 Yr, 9X5, Software Technical Support	HA106A3	9Cx
Support - 4 Yr, 9X5, Software Technical Support	HA106A4	9Cx
Support - 5 Yr, 9X5, Software Technical Support	HA106A5	9Cx
Support - 1 Yr, 24x7, Software Technical Support	HA107A1	9Cx
Support - 3 Yr, 24x7, Software Technical Support	HA107A3	9Cx
Support - 4 Yr, 24x7, Software Technical Support	HA107A4	9Cx
Support - 5 Yr, 24x7, Software Technical Support	HA107A5	9Cx
Support - 1 Yr, Support Plus	HA109A1	9Cx
Support - 3 Yr, Support Plus	HA109A3	9Cx
Support - 4 Yr, Support Plus	HA109A4	9Cx
Support - 5 Yr, Support Plus	HA109A5	9Cx
Support - 1 Yr, Support Plus 24	HA110A1	9Cx
Support - 3 Yr, Support Plus 24	HA110A3	9Cx
Support - 4 Yr, Support Plus 24	HA110A4	9Cx
Support - 5 Yr, Support Plus 24	HA110A5	9Cx
Support - 1 Yr, Proactive 24	HA111A1	9Cx
Support - 3 Yr, Proactive 24	HA111A3	9Cx
Support - 4 Yr, Proactive 24	HA111A4	9Cx
Support - 5 Yr, Proactive 24	HA111A5	9Cx
Support - 1 Yr, Critical Services	HA112A1	9Cx
Support - 3 Yr, Critical Services	HA112A3	9Cx
Support - 4 Yr, Critical Services	HA112A4	9Cx
Support - 5 Yr, Critical Services	HA112A5	9Cx

Support Bands: T5512A=9CM; T5513A=9CN; T5514A=9CQ ; T5515A=9CP

Support Services via HP Authorized Commercial Resellers - Fixed Care Packs Array SKUs: AJ742A, AJ743A, AJ745A

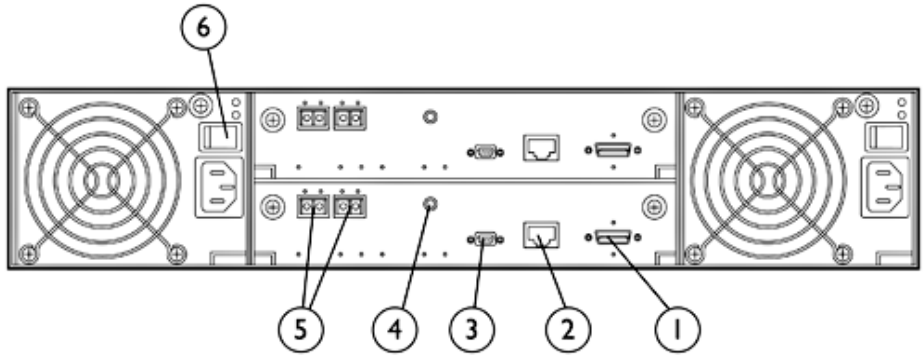
Support Description	Fixed Care Pack Part Number
HP 1y NBD 9x5 MSA2000 Array HWSupp	UJ669E
HP 1y 4 hr 13x5 MSA2000 Array HWSupp	UJ670E
HP 1y 4h 24x7 MSA2000 Array HWSupp	UJ671E
HP 1y 6h CTR MSA2000 Array HWSupp	UJ672E
HP 3y NBD 9x5 MSA2000 Array HWSupp	UJ673E
HP 3y 4h 13x5 MSA2000 Array HWSupp	UJ674E
HP 3y 4h 24x7 MSA2000 Array HWSupp	UJ675E
HP 3y 6h CTR MSA2000 Array HWSupp	UJ676E
HP 3y 4h 13x5 w/DMR MSA2000 Array HWSupp	UJ677E
HP 3y 4h 24x7 w/DMR MSA2000 Array HWSupp	UJ678E
HP 3y 6h CTR w/DMR MSA2000 Array HWSupp	UJ679E
HP 4y NBD 9x5 MSA2000 Array HWSupp	UJ680E
HP 4y 4h 13x5 MSA2000 Array HWSupp	UJ681E
HP 4y 4h 24x7 MSA2000 Array HWSupp	UJ682E
HP 4y 6h CTR MSA2000 Array HWSupp	UJ683E
HP 5y NBD 9x5 MSA2000 Array HWSupp	UJ684E
HP 5y 4h 13x5 MSA2000 Array HWSupp	UJ685E
HP 5y 4h 24x7 MSA2000 Array HWSupp	UJ686E
HP 5y 6h CTR MSA2000 Array HWSupp	UJ687E
HP 5y 4h13x5 w/DMR MSA2000 Array HWSup	UJ688E
HP 5y 4h 24x7 w/DMR MSA2000 Array HWSupp	UJ689E
HP 5y 6h CTR w/DMR MSA2000 Array HWSupp	UJ690E
HP 1Y PW NBD MSA2000 Array HWSupp	UK193PE
HP 1Y PW 4H 13x5 MSA2000 Array HWSupp	UK194PE
HP 1Y PW 4H 24x7 MSA2000 Array HWSupp	UK195PE
HP 1Y PW 6H CTR MSA2000 Array HWSupp	UK196PE

Support Services via HP Authorized Commercial Resellers - Fixed Care Packs Drive Enclosure SKUs: AJ749A, AJ750A

Support Description	Fixed Care Pack Part Number
HP 1y NBD 9x5 MSA2000 Enclosure HWSupp	UK223E
HP 1y 4h 13x5 MSA2000 Enclosure HWSupp	UK224E
HP 1y 4h 24x7 MSA2000 Enclosure HWSupp	UK225E
HP 1y 6h CTR MSA2000 Enclosure HWSupp	UK226E
HP 3y NBD 9x5 MSA2000 Enclosure HWSupp	UK227E
HP 3y 4h 13x5 MSA2000 Enclosure HWSupp	UK228E
HP 3y 4h 24x7 MSA2000 Enclosure HWSupp	UK229E
HP 3y 6h CTR MSA2000 Enclosure HWSupp	UK230E
HP 3y 4h 13x5 w/DMR MSA2000 Encl HWSup	UK231E
HP 3y 4h 24x7 w/DMR MSA2000 Encl HWSup	UK232E
HP 3y 6h CTR w/DMR MSA2000 Encl HWSupp	UK233E
HP 4y NBD 9x5 MSA2000 Enclosure HWSupp	UK234E
HP 4y 4h 13x5 MSA2000 Enclosure HWSupp	UK235E
HP 4y 4h 24x7 MSA2000 Enclosure HWSupp	UK236E
HP 4y 6h CTR MSA2000 Enclosure HWSupp	UK237E
HP 5y NBD 9x5 MSA2000 Enclosure HWSupp	UK238E
HP 5y 4h 13x5 MSA2000 Enclosure HWSup	UK239E
HP 5y 4h 24x7 MSA2000 Enclosure HWSupp	UK240E
HP 5y 6h CTR MSA2000 Enclosure HWSupp	UK241E
HP 5y 4h13x5 w/DMR MSA2000 Enclosure HWSupp	UK242E
HP 5y 4h 24x7 w/DMR MSA2000 Encl HWSup	UK243E
HP 5y 6h CTR w/DMR MSA2000 Encl HWSup	UK244E
HP 1Y PW NBD MSA2000 Enclosure HWSupp	UK245PE
HP 1Y PW 4H 13x5 MSA2000 Encl HWSup	UK246PE
HP 1Y PW 4H 24x7 MSA2000 Encl HWSup	UK247PE
HP 1Y PW 6H CTR MSA2000 Encl HWSupp	UK248PE

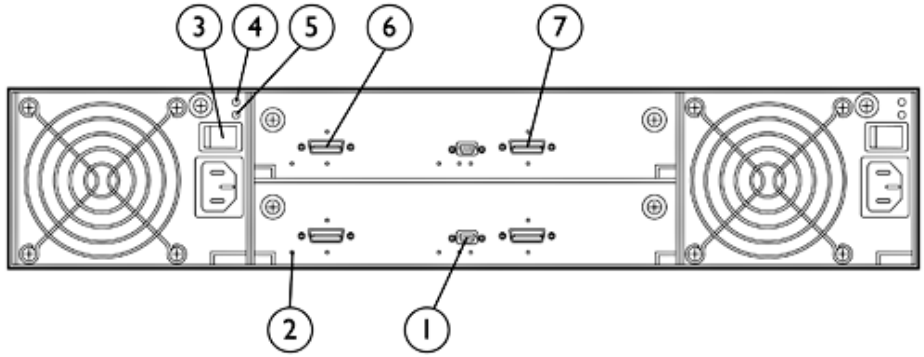
Support Services via HP Authorized Commercial Resellers - Fixed Care Packs Software SKUs: T5512A, T5513A, T5514A, T5515A

Support Description	Fixed Care Pack Part Number
HP 3y 24x7 MSA2000 Snpsht64 SW Support	UK249E
HP 3y 24x7 MSA2000 Snpsht8 SW Support	UK250E
HP 3y 24x7 MSA2000 Snpsht8-64 SW Supp	UK251E
HP 3y 24x7 MSA2000 Vol Copy SW Supp	UK252E



Dual Controller MSA2000fc

1. Expansion Port
2. Ethernet Port
3. CLI Port
4. Service Port
5. Fibre Channel Ports
6. Power Switch



MSA2000 Dual I/O 3.5" 12 Drive Enclosure

1. Service Port
2. Unit Locator
3. Power Switch
4. DC Voltage / Fan Fault
5. AC Power Good
6. SAS In Port
7. SAS Out Port

Configuration Information

Configure to Order Program Information

HP introduces the new Configure to Order program for the MSA2000 family The MSA2000 models and options may or may not be factory installed in a rack with add-on controllers, switches, hubs, MSA2000 disk enclosures and hard drives. The MSA2000 arrays may be integrated with ProLiant servers or as standalone storage.

Description	Product #
HP 2012fc Single Controller Modular Smart Array	AJ742A#0D1
HP 2012fc Dual Controller Modular Smart Array	AJ743A#0D1
HP 2000fc Modular Smart Array Controller (for 2012fc Single Controller model)	AJ744A#0D1
HP 2212fc DC Enhanced Modular Smart Array	AJ745A#0D1
HP MSA2000 3.5in Single I/O 12 Drive Encl	AJ749A#0D1
HP MSA2000 3.5in Dual I/O 12 Drive Encl	AJ750A#0D1
HP MSA2000 Drive Enclosure I/O Module	AJ751A#0D1
HP MSA2 146GB 3G 15K 3.5 inch SAS HDD	AJ735A#0D1
HP MSA2 300GB 3G 15K 3.5 inch SAS HDD	AJ736A#0D1
HP MSA2 450GB 3G 15K 3.5 inch SAS HDD	AJ737A#0D1
HP MSA2 500GB 7.2K 3.5 inch SATA HDD	AJ738A#0D1
HP MSA2 750GB 7.2K 3.5 inch SATA HDD	AJ739A#0D1
HP MSA2 1TB 7.2K 3.5 inch SATA HDD	AJ740A#0D1

Step 1 - MSA2000fc - Base Configuration

Select one:

Model Name	Model Description:	Part Number
MSA2012fc	HP StorageWorks 2012fc Dual Controller Modular Smart Array	AJ743A
MSA2012fc	HP StorageWorks 2012fc Single Controller Modular Smart Array	AJ742A
MSA2212fc	HP StorageWorks 2212fc Dual Enhanced Controller Modular Smart Array	AJ745A

Step 2 - Options

Select each option with quantities specified.

NOTE: SATA drives are designed for archival or reference data. They should not be used in a heavy or intense I/O environment. Those situations require the use of enterprise-class SAS drives. MSA2 3.5" drives are for use only with MSA2000 products.

Step 2a - Options

Description with Parts Shipped:	Quantity	Part Number

The base controller chassis with one or two controllers has twelve drive bays for both SAS and/or SATA drives. For additional twelve additional drive bays purchase an MSA2000 3.5" Disk Enclosure. You may attach a total of three Drive Enclosures for a total of forty-eight drive bays. Single controller arrays support Single I/O Disk Enclosures, dual controller arrays support Dual I/O Disk Enclosures.

Step 2b - SAS and SATA Drive Options

NOTE: MSA2000 3.5" drives are for use only with MSA2000 products.

HP StorageWorks MSA2 146GB 3G 15K 3.5 inch Dual-port SAS HDD AJ735A

Configuration Information

HP StorageWorks MSA2 300GB 3G 15K 3.5 inch Dual-port SAS HDD	AJ736A
HP StorageWorks MSA2 450GB 3G 15K 3.5 inch Dual-port SAS HDD	AJ737A
HP StorageWorks MSA2 500GB 7.2K 3.5 inch SATA HDD	AJ738A
HP StorageWorks MSA2 750GB 7.2K 3.5 inch SATA HDD	AJ739A
HP StorageWorks MSA2 1TB 7.2K 3.5 inch SATA HDD	AJ740A

Step 2c - Drive Enclosure Options

Should you want a drive enclosure, the model you choose depends on which array model it attaches to. If it is a single controller array, then choose the JBOD designated as "Single I/O". If it is attaching to a dual controller array then choose the "Dual I/O" JBOD

HP StorageWorks MSA2000 Single I/O 3.5 in 12 Drive Enclosure	AJ749A
HP StorageWorks MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure	AJ750A

SAS Cables

HP Ext SAS 1m Cable	389665-B21
HP Ext SAS 2m Cable	389668-B21
HP Ext SAS 4m Cable	389671-B21

Step 3 - Other MSA2000fc Options

Description	Quantity	Part Number
HP StorageWorks 2000fc Modular Smart Array Controller (for future upgrading of a single controller Fibre Channel array to a dual controller model)		AJ744A
HP StorageWorks MSA2000 Drive Enclosure I/O Module (for future upgrading of a single I/O 3.5" Disk Enclosure to a dual controller model)		AJ751A
Choose optional Power Cord for Non-U.S. Configurations		
NOTE: Shipped standard with all units.		
2 ea. Power Cord, 110/220 VAC, US/Canada/Mexico 227099-001		
Power Cord, 220/240 VAC, (US/Canada/Mexico)	2	227099-001
Power Cord, (Australia/China/New Zealand)	2	227098-001
Power Cord, (Central Europe)	2	157215-001
Power Cord, (United Kingdom/Hong Kong)	2	157216-001
Power Cord, (Switzerland)	2	157219-001
Power Cord, (Italy)	2	157217-001
Power Cord, (Denmark)	2	157218-001
Power Cord, (Japan)	2	139867-001
Power Cord, (South East Asia/India)	2	157220-001

Step 4 - Choose Supported Options For Fibre Channel Infrastructure

Fibre Channel Host Bus Adapters	Model	Description	Part Number
	FC2242SR	4Gb PCI-E Dual Channel HBA for Windows (future Linux support)	A8003A
	FC2142SR	4Gb PCI-E for Windows (future Linux support)	A8002A

	FC2243	4Gb PCI-X Dual Channel for Windows (future Linux support)	AD168A
	FC2143	4Gb PCI-X 2.0 for Windows (future Linux support)	AD167A
	FC1243	HP StorageWorks Dual Channel 4Gb PCI-X 2.0 HBA	AE369A
		HP StorageWorks 81Q PCIe 8Gb Fibre Channel HBA	AK344A
		HP StorageWorks 82Q PCIe Dual Channel 8Gb HBA	AJ764A
		HP StorageWorks 81E PCIe 8Gb Fibre Channel HBA	AJ762A
		HP StorageWorks 82E PCIe Dual Channel 8Gb HBA	AJ763A
	FC1242SR	4Gb PCI-E Dual Channel HBA for Windows and Linux	AE312A
	FC1142SR	4Gb PCI Express HBA for Windows and Linux	AE311A
	FC1243	4Gb PCI-X 2.0 Dual Channel for Windows and Linux	AE369A
	FC1143	4Gb PCI-X 2.0 for Windows and Linux	AB429A
	Bladeserver HBA	Lpe1105-HP 4Gb FC HBA for HP c-Class BladeSystem (future Linux support)	403621-B21
	Bladeserver HBA	QMH2462 4Gb FC HBA for HP c-Class BladeSystem Windows and Linux	403619-B21
Fibre Channel Switches	Brocade 4/12 SAN Switch for HP c-Class Blade System, Base		AE370A
	Brocade 4/24 SAN Switch for HP c-Class Blade System, Full Fabric		AE372A
	Brocade 4/24 SAN Switch for HP c-Class Blade System, Power Pack		AE371A
	HP StorageWorks 4/8 Base SAN Switch		A7984A
	HP StorageWorks 4/16 SAN Switch		A7985A
	HP StorageWorks 4/16 SAN Switch Power Pack		A7987A
	HP StorageWorks 4/8 SAN Switch		A8000A
	HP StorageWorks 4/32B Base SAN Switch		AG756A
	HP StorageWorks 4/32B Full SAN Switch		AG757A
	HP StorageWorks 4/32B Power Pack SAN Switch		AG758A
	HP StorageWorks 8/8 Base SAN Switch		AM866A
	HP StorageWorks 8/8 SAN Switch		AM867A
	HP StorageWorks 8/24 Base SAN Switch		AM868A
	HP StorageWorks 8/40 Base SAN Switch		AM869A
	HP StorageWorks 8/40 Power Pack SAN Switch		AM870A
	Brocade 8/12c SAN Switch for HP BladeSystem c-Class		AJ820A
	Brocade 8/24c SAN Switch for HP BladeSystem c-Class		AJ821A
	Brocade 8/24c SAN Switch for HP BladeSystem c-Class Power Pack+		AJ822A
	MSA SAN Switch 2/8 (not used in the MSA2000 but new array may attach to it)		288247-B21
	8 Gb Simple SAN Connection (restrictions apply)		
	HP StorageWorks 8/20q Fibre Channel Switch (16 switch ports active)		AK242A
	HP StorageWorks 8Gb Simple SAN Connection Kit (8 switch ports active)		AK241A
	Cisco MDS 9124 8-ports Active Fabric Switch		AG646A

	Cisco MDS 9124 16-ports Active Fabric Switch	AG647A
	Cisco MDS 9124 24-ports Active Fabric Switch	AG648A
	Cisco MDS 9124e 12-port Fabric Switch for HP c-Class BladeSystem	AG641A
	Cisco MDS 9124e 24-port Fabric Switch for HP c-Class BladeSystem	AG642A
	Cisco MDS 9134 24-ports Active Fabric Switch	AG874A
	Cisco MDS 9134 32-ports Active Fabric Switch	AG875A
	Cisco MDS 9134 26-ports Active w/kit for 48 port solution	AJ732A
	Cisco MDS 9134 34-ports Active w/kit for 64 port solution	AJ733A
	MDS 9222i Multiservice Modular Switch w/0 SFPs	AG851A
	Cisco MDS 9216i w/o Ethernet SFP switch	AE390A
	Cisco MDS 9216i	AE390A
Fibre Channel Cables	2 m LC-LC Multi-Mode Fibre Channel Cable	221692-B21
	5 m LC-LC Multi-Mode Fibre Channel Cable	221692-B22
	15 m LC-LC Multi-Mode Fibre Channel Cable	221692-B23
	30 m LC-LC Multi-Mode Fibre Channel Cable	221692-B26
	50 m LC-LC Multi-Mode Fibre Channel Cable	221692-B27
	2 m LC-SC Multi-Mode Fibre Channel Cable	221691-B21
	5 m LC-SC Multi-Mode Fibre Channel Cable	221691-B22
	15 m LC-SC Multi-Mode Fibre Channel Cable	221691-B23
	30 m LC-SC Multi-Mode Fibre Channel Cable	221691-B26
	50 m LC-SC Multi-Mode Fibre Channel Cable	221691-B27

Step 5 - Choose Rack Options

Select each required option with quantities specified.

Rack Cabinet, Customer Assembled	
5642 – 5000 Series rack	358254-B21
14U rack	
HP S10614 Rack with Shock Pallet	292302-B22
Rack Cabinets 10622 G2	
10622 G2 Universal Rack w/Shock Pallet	AF022A
10622 G2 Universal Rack w/Standard Pallet	AF021A
Rack Cabinets under 10636 G2	
10636 G2 (36U) Rack Cabinet – Pallet	AF011A
10636 G2 (36U) Rack Cabinet – Shock Pallet	AF012A
10636 G2 (36U) Rack Cabinet – Crated	AF013A
10636 G2 (36U) Rack Cabinet, with Extension - Shock Pallet	AF014A
Rack Cabinets 10642 G2	

10642 G2 (42U) Rack Cabinet – Pallet	AF001A
10642 G2 (42U) Rack Cabinet – Shock Pallet	AF002A
10642 G2 (42U) Rack Cabinet – Crated	AF003A
10642 G2 (42U) Rack Cabinet, with Extension - Shock Pallet	AF004A
Modular Cooling System G2 (MCS G2)	AF025A
MCS G2 10642 G2 Expansion Rack	AF026A

Rack Cabinets 10842 G2

10842 G2 Universal Rack w/Shock Pallet	AF042A
10842 G2 Universal Rack w/Standard Pallet	AF041A

Rack Cabinets 10647 G2

10647 Rack G2 Pallet	AF031A

MSA2000fc	POWER REQUIREMENTS	
	Input Power Requirements	100-240VAC, 50/60 Hz, 4.5-1.9A
	Max Input Power	475W maximum continuous
	Heat Dissipation	1622 BTU/hour
	TEMPERATURE AND HUMIDITY RANGES	
	Operating Temperature	41° F to 104° F (5° C to 40° C)
	Shipping Temperature	-40° F to 158° F (-40° C to 70° C) NOTE: Derate 2° C for every km, up to 3000 meters
	Operating Humidity	10% to 90% RH @ 104° F (40° C), non-condensing
	Non-Operating Humidity	Up to 93% RH @ 104° F (40° C), non-condensing
	DECLARED ACOUSTIC NOISE LEVELS	
	Sound Power	<6.03B Sound Power
	Sound Pressure	<55dBA Sound Pressure
	SHOCK AND VIBRATION	
	Shock, Operational	5.0G, 10ms, half sine
	Shock, Non-Operational	15G 11ms, half sine
	Vibration, Operational	0.21Grms Random 5Hz to 500Hz flat spectrum/feed forward
	Vibration, Non-Operational	0.5G 1 octave/minute 5Hz to 500Hz to 5 Hz sine sweep
		0.5Grms Random 20Hz to-1000Hz flat spectrum
	PHYSICAL	
	Height	3.5 in (8.9 cm)
	Depth (excluding cables)	23.7 in (60.2 cm)
	Width	17.6 in (44.7 cm)
	Chassis Weight	44 lbs (19.96 kg)

Modular SAN Array 2000fc Controller	User Interface	- Status and activity provided via management interfaces Status Indicators on front of Controller
	RAID Support	0, 1, 3, 5, 6, 10, 50
	Cache Memory	1GB Read/Write. ECC protection with backup to Flash memory (indefinite backup)
	Cache Backup	ECC protection with back up to flash memory (indefinite backup)
	Upgradeable Firmware	- yes - partner firmware update (PFU)
	Disk Drive and Enclosure Protocol Support	3Gb SAS - Serial Attached SCSI / 3 Gb SATA II
	Expansion Port	One 4X SAS connector (SFF8470) Expand up to 3 more disk enclosures

Regulatory	Safety	UL 60950-1:2003 (USA)
		CAN/CSA-C22.2 No.60950-1-03 (Canada)
		EN 60950-1 :2001 + A11 (European Union)
		IEC 60950-1 :2001 (International)
	Electromagnetic Compatibility	CFR 47 Part 15 Subpart B (U.S.A., Class A)
		ICES-003 Issue 4 (Canada, Class A)
		EN 55022 :98 +A1 +A2 (European Union, Class A)
		EN61000-3-2:2000+A1,+A2,+A14 (Harmonics)
		EN 61000-3-3 :2001 (Flicker)
		EN 55024 :1998 +A1 (European Union, Immunity)
		CISPR 22 :2005 (International, Class A)
		CISPR 24 :97 (International, Immunity)
	RoHS and WEEE	RoHS-5 Compliance , China RoHS, WEEE
	Country Approvals	Australia/New Zealand, Canada, China (PRC), European Union, Germany (GS Mark), Japan, South Korea, Taiwan, United States

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